**Agilent 4294A precision impedance analyzer**

There are 6 measurement panels: Active Trace, Measurement, Entry, Marker and Instrument State.

1. Press LINE to turn power on. Warm up approximately 45 minutes before making measurements.

2. **INSTRUMENT STATE** > Preset – This resets all previously stored values to their default.

3. **MEASUREMENT** > **Meas** > **|Z| − θ**
   > **Format** > **Log**
   > **Display** > **SPLIT** ON to get two displays
   > **Scale Ref** > **Top Value** > 100 G/n
   This is 100 GΩ = 10^11 Ω
   > **Bottom Value** > 10 k/m
   This is 10 kΩ
   > **Bw/Avg** > **Bandwidth** > 5 PRECISE
   > **POINT AVG ON**
   > **POINT AVG FACTOR** > 5x1

4. **STIMULUS** > **Sweep** > **NUMBER OF POINTS** > 51 x 1
   > **TYPE** > **LOG**
   > **Source** > **LEVEL** > 500 k/m x 1, this is 500 mV RMS
   > **BIAS MENU** > **VOLTAGE LEVEL** > 0 x 1

5. **STIMULUS** > **Trigger** > **CONTINUOUS** to have the measurement repeat
   > **SINGLE** to initiate one measurement
   > **Start** > 100 x 1
   > **Stop** > 100 M/u

6. **MEASUREMENT** > **Cal** > **Adaptor [1m]** > **4TP 1M** > **SETUP** > **PHASE COMP**
   When complete press done.

   At this point, the instrument is measuring the impedance of the Cascade probe station. Confirm that the system |Z| − θ vs. frequency is the same for the two measurement cases posted: OPEN – both probes up, just above the surface, SHORT – both probes on the wafer chuck and separated by one probe diameter.

7. **STIMULUS** > **Source** > **LEVEL** > 5 k/m x 1, this reduces the oscillator level to 5 mV for device measurement.

8. Null out the probe system impedance.
   Add chuck triaxial short, lower LO probe to device common pad.
   Position HI probe a few microns above the pad to receive bias.
   MEASUREMENT > **Cal** > **FIXTURE COMPEN** > **OPEN**
   Short HI probe to same pad as the LO probe
   MEASUREMENT > **Cal** > **FIXTURE COMPEN** > **SHORT**

   MARKER – use to read the values of Z – θ – and frequency

   At this point the system is calibrated and ready to proceed with measurements.

9. To save data

   **INSTRUMENT STATE** > **Save** > **DATA** > **ASCII** > rotate knob to select letter F for February

   SELECT LETTER > give a filename like FB28A

   Choose DONE